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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09/916,566
Filing Date: July 27, 2001
Appellant(s): MAZUMDER ET AL.

Mr. John G. Posa (#34,424)
For Appellant

EXAMINER'S ANSWER

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

The amendment after final rejection filed on 21 May 2004 has been entered.

.(5) Summary of Invention

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is correct.

(7) Grouping of Claims

Appellant's brief includes a statement that claims 1 and 3-8 do not stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8).

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

6,046,426	JEANTETTE ET AL.	4-2000
6,526,327	KAR ET AL.	2-2003

(10) Grounds of Rejection

The following ground(s) of rejection have been updated to reflect the applicant's after-final amendment and are applicable to the appealed claims:

Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jeantette et al. (USPN 6,046,426 A) in view of Kar et al. (USPN 6,526,327 B2).

The limitations of claim 1 and the relevant citations in Jeantette et al. are as follows:

A system for automatically controlling the build-up of material on a substrate (column 1, lines 10-14), comprising:

a controllable [semiconductor diode] laser having a beam directed to a localized region of the substrate so as to form a melt pool thereon (column 9, lines 15-24);

a material feeder for feeding material into a melt pool to be melted by the beam to create a deposit having a physical attribute (column 2, lines 10-36);

an optoelectric sensor operative to output an electric signal as a function of the physical attribute (column 8, lines 8-26); and

a feedback controller operative to automatically adjust the rate of material deposition as a function of the electric signal (column 10, lines 26-49) by modulating the laser to control the power of the beam (column 10, lines 1-25 wherein "the use of a continuously variable beam attenuator" as cited in line 22 is considered to be equivalent to modulating the laser).

The Jeantette et al. reference discloses that any laser source with sufficient power and reasonable absorption to melt the material would suffice as a laser source (column 9, lines 15-24). However, Jeantette et al. does not recite the use of a diode laser.

Kar et al. has been presented to show that the use of a diode laser in an analogous system (Kar et al., column 4, lines 11-48) was well known in the art at the time the invention was made. Kar et al. recites the use of such lasers at column 8, lines 44-49.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have applied the teaching of Kar et al. to the Jeantette et al. system because Kar et al. demonstrates that a diode laser is a laser with sufficient power and reasonable absorption to melt a deposited material as required by Jeantette et al. (Kar et al., column 8, lines 27-64).

2. (Cancelled)

Claims 3 and 4 requiring laser modulation in the kilohertz range, up to 20 kHz, are read in Jeantette et al. at column 10, lines 1-25 (specifically lines 23-25).

Method claims 5-8 recite steps corresponding to elements recited in system claims 1,3 and 4, and therefore are rejected under the same rationale.

(11) Response to Argument

The examiner has attempted to address the applicant's argument in the same order as presented in the appeal brief.

The applicant has argued that argued that it would have not been obvious to one of ordinary skill in the art would to have combined the teachings of Kar et al. with the Jeantette et al. system.

The prior art systems are analogous. Both Jeantette et al. and Kar et al. are automated manufacturing systems used to create three-dimensional objects via layer-by-layer deposition. In both systems a raw build material in powder form is deposited in a layer on an object and then is fixed (melted) into place via a laser.

The applicant continues to argue the necessity of motivation for combining the two references.

The examiner stated in the original rejection, and affirmed via the response to arguments in the final rejection, that the secondary reference was presented only to demonstrate that the use of laser diodes in a laser deposition system was well known in the art at the time the invention was made. The Kar et al. reference demonstrates that a diode laser is but one of a multitude of known laser energy sources including CO_2, Nd:YAG, etc. that could be used in a laser deposition system (Kar et al., column 4, lines 11-48).

The examiner has made a prima facie case of obviousness as set forth in the examiner's answer. The examiner has shown what was disclosed in primary reference Jeantette et al., what was omitted by Jeantette et al., where the deficiency is read in the secondary reference Kar et al., and has given a motivation to combine the two references. The applicant has not pointed out the deficiencies of this rejection as presented in the examiner's answer.

The applicant then continues on page 3, second paragraph, to state that the examiner has used the incorrectly defined "modulation" (defined in the response to arguments, item 10d in the final office action), and presents further definitions of "modulation" in exhibits A and B of the Appeal brief.

The disputed limitation is read in amended claim 1 as follows: "a feedback controller operative to automatically adjust the rate of material deposition as a function of the electric signal by modulating the laser to control the power of the beam."

The examiner has relied upon a common dictionary definition wherein "modulation" is "the variation of a property of an electromagnetic wave or signal, such as its amplitude, frequency, or phase" (American Heritage Dictionary of the English language, www.dictionary.com). Taking this definition into consideration, the broadest most reasonable interpretation of this requirement is controlling the amplitude (laser power), frequency or phase using feedback.

The alternative definition presented in applicant's exhibit B is a shortened citation of the full definition which states on submitted page 1135, column1, line 6: "The carrier may be altered in accordance with the intelligence (speech, music, television picture,

etc.) in three fundamental ways, by varying the amplitude of the carrier giving amplitude modulation, by varying the frequency of the carrier giving frequency modulation, or by varying the phase of the carrier, thereby producing phase modulation." The examiner therefore contends that this full definition of "modulation" cited by the applicant in actuality agrees with the shorter definition offered by the examiner and traverses the applicant's argument that the examiner's definition is lacking.

The applicant concludes the modulation argument by stating that controlling power, for example by the use of a variable beam attenuator would only result in intensity control, and not in modulation. However, in view of the previous definition, the examiner contends that this limitation is obvious in view Jeantette et al. at column 10, lines 1-25 wherein a feedback system is used to continuously control the output of the laser either through direct control of the laser power supply or via a continuously variable beam attenuator. Modulation includes the control of signal amplitude, which in turn would control the power of the laser. Therefore, the citation in Jeantette et al. makes obvious the modulation requirement in the instant claims.

The applicant proceeds to note that Jeantette, which including some form of feedback, does not recite the use of a diode laser source. The examiner acknowledges the omission of a diode source from Jeantette et al. and has cited Kar et al. to account for this deficiency. Kar et al. demonstrates that the use of a diode laser in a laser deposition system was well known in the art at the time the invention was made.

The applicant offers a final argument that a rejection of method claims in view of system claims with the same functional limitations does not give full weight to the method claims.

Claims 1,3 and 4 are not simply similar claims. Amended claim 1, despite some minor wording differences, has identical requirements to claims 5 and 6 combined. Claim 3 has identical requirements to claim 7, and claim 4 has identical requirements to claim 8. Therefore, the method stated by claims 5-8 is a necessary offshoot of the system described in claims 1,3 and 4. It would be impossible to practice the use of the system without the method subsequently claimed method.

For the reasons stated above, it is believed that the rejections should be sustained.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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